ERCB Energy Resources Conservation Board

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Directive 082

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Operating Criteria: Resource Recovery Requirements for Oil Sands Mine and Processing Plant Operations

The Energy Resources Conservation Board (ERCB/Board) has approved this directive on February 11, 2013.

<original signed by>

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1 Introduction

1.1 Purpose of This Directive

This directive identifies the operating criteria used by the ERCB to identify the oil sands that an operator is required to mine as part of its operation and specifies the volume of bitumen that an operator is required to recover from its mining and processing operations.

These criteria allow industry greater operational flexibility, while at the same time fulfilling the ERCB's mandate "to effect conservation and prevent waste of the oil sands resources."[1] Although the criteria define minimum requirements, industry has committed to a program of continuous improvement.

This directive applies to all oil sands mine and processing plant operations.

1.2 What's New in This Directive

This directive replaces and supersedes *Interim Directive (ID) 2001-07: Operating Criteria: Resource Recovery Requirements for Oil Sands Mine and Processing Plant Sites*. *ID 2001-07* has been renumbered and reformatted as a directive, but there are no changes or additions to the requirements.

1.3 Compliance Assurance

ERCB requirements are those rules that an operator is required to follow. The term "must" indicates a requirement, while terms such as "recommends" and "expects" indicate recommended practices.

Each ERCB requirement is numbered and has been risk assessed. Noncompliance with any requirement will result in the operator receiving a response in accordance with the latest edition of *Directive 019: Compliance Assurance*. A list of noncompliant events is available from the ERCB website, www.ercb.ca.

The ERCB encourages all operators to be proactive by monitoring their compliance with ERCB requirements. If an operator identifies a noncompliance, it should inform the ERCB of the noncompliance for consideration under the ERCB Voluntary Self-Disclosure policy set out in *Directive 019*.

For further details on compliance assurance, including *Directive 019*, see the ERCB website, www.ercb.ca.

2 Bitumen Recovery

Four criteria will be used together to establish the volume of bitumen that an operator is required to recover each year from its mining and processing operations. The criteria will not be enforced individually. The criteria are as follows:

- The **in situ oil sands cutoff grade** is defined as the minimum bitumen content of the oil sands that would be classified as ore. It has been set at 7 weight per cent bitumen.

[1] *Oil Sands Conservation Act*, Section 3(a).

- The **minimum mining thickness (mining selectivity)** is defined as the minimum thickness of ore that can be separated from waste or waste that can be separated from ore. It has been set at 3 metres (m).

- The **ratio of cutoff total volume to bitumen in place (TV/BIP)**[2] is defined as the minimum value for TV/BIP that would be used to determine the pit crest limits. It has been set at 12.

- **Processing plant recovery** is a variable factor based on the average bitumen content of the as-mined ore.[3] The factor is determined as follows:

  - If the average bitumen content of the as-mined ore is 11 weight per cent bitumen or greater, the recovery factor is 90 weight per cent.

  - If the average bitumen content of the as-mined ore is less than 11 weight per cent bitumen, recovery is determined by the following equation, where x is the average weight per cent bitumen content of the as-mined ore:

$$\text{Recovery} = -202.7 + 54.1(x) - 2.5(x^2)$$

The ERCB will conduct an annual compliance review and calculate the volume of bitumen an operator is required to recover using the above four criteria and other data provided by the operator.

1) Each calendar year, an operator must recover the volume of bitumen from its mining and processing operations that is equal to or greater than the volume of bitumen calculated by the ERCB and reported to PETRINEX.

2) To ensure accuracy, an operator must submit to the ERCB its nonlicensed drillhole data.

3) An operator must provide quality mine survey data to allow the total volume of material mined during the reporting period to be calculated to within an accuracy of 1 per cent.

It is critical to the success of operating criteria that each operator have in place an appropriate system to measure and report on its actual bitumen recovery for comparison against the calculated recovery. As stated in the *Oil Sands Conservation Regulation*, it is an operator's responsibility to demonstrate to the satisfaction of the ERCB that it has the necessary measurement and reporting systems in place.

[2] TV/BIP = (Ore Volume + Interburden Volume + Overburden Volume) ÷ (Volume of Bitumen in Place) where ore, interburden, and overburden volumes are in bank cubic metres and bitumen in place is in cubic metres and refers to the volume of bitumen in zones passing the minimum mining thickness and cutoff grade criteria.

[3] A 0.5 m swap thickness at the base of each ore or waste zone will be allowed for to account for the impact of dilution/reduction on in situ grade and to convert "ore" to "as-mined ore."

3 Sterilization

The ERCB will use these operating criteria to identify the oil sands that an operator must mine from a given project area. It will also use these criteria to identify oil sands that may be affected by a proposed development but are outside the project area.

Any action of an operator that results or tends to result in a reduction in the volume of oil sands mined (as identified by operating criteria) may be a case of sterilization. Such actions could include the location of permanent surface facilities on oil sands, bypassing oil sands located outside the mine site, or bypassing oil sands within the mine site.

While the ERCB recognizes that some oil sands may be sterilized due to valid environmental, technical, economic, or operational reasons, it is the ERCB's objective to minimize such sterilization.

4) An operator must apply to the ERCB for an approval in all cases of potential sterilization.

Any economic evaluation submitted in support of an application will be based on the principles previously established under Resource Recovery Economics.[4] Each application for sterilization will be subject to a detailed review by the ERCB, and the ERCB may approve or deny the application.

4 Annual Mine Plan

Pursuant to Section 30 of the *Oil Sands Conservation Regulation*, an operator must submit to the ERCB, for its approval, details of its annual mine plan for the next calendar year of operation. This is required in order for the ERCB to maintain an awareness of development activity, identify potential issues that may affect resource recovery, and address areas of uncertainty that may be identified at the time of an application.

5) An operator must submit its annual drilling plan for approval.

Submission of the drilling plan will provide the ERCB with a better opportunity to assess resource recovery issues such as the establishment of final pit limits and the impacts of out-of-pit developments on resource recovery. If the ERCB is of the opinion that the proposed drilling plan will not provide sufficient high-quality geological data to determine an operator's compliance with bitumen recovery requirements, the ERCB will identify the deficient areas and will require that the operator address them through additional drilling.

Drilling requirements for ongoing operations may be specified by the ERCB on a case-by-case basis.

5 Drilling Requirements

The following drilling requirements allow the ERCB to evaluate an application for a new mine or processing plant site or an extension in project area at an approved mine or processing plant site. The ERCB may consider requests by an applicant to vary the drilling requirements if the applicant demonstrates that circumstances warrant. However, to minimize the risk of the application being declared incomplete on the basis of inadequate drilling data, it is the applicant's responsibility to meet with the ERCB well in advance of filing an application if it intends to request any variance in drilling requirements.

[4] As per letter to industry from the ERCB dated August 28, 2000.

5.1 Drilling Data Quality

6) All new drilling must contain a suite of quality resistivity, gamma, and density logs; quality-controlled Dean/Stark core analysis; no more than 15 per cent evenly distributed lost core within the bitumen-bearing zone; and identifiable McMurray Formation top and base markers.

7) Older drilling results contain various qualities and combinations of the above information over all or portions of the McMurray Formation. Each of these older drillholes must have no more than 20 per cent evenly distributed lost core within the complete McMurray Formation and quality-controlled Dean/Stark core analysis.

Drillholes whose analysis coverage and quality is suspect and log-only results are not accepted unless an applicant justifies their inclusion.

5.2 Drilling Density

8) An applicant must delineate the bitumen resource base under the mine and processing plant sites in accordance with the following:

   a) For all areas subject to development within the first ten years and for a 1 kilometre (km) buffer around these areas, the maximum spacing between drillholes meeting the drilling data quality requirements must be 350 m as determined by triangulation. If any one side of the triangle is greater than 350 m, the ERCB will determine if additional drilling is required.

   b) For all other areas subject to development after the first ten years and for a 1 km buffer around these areas, the maximum spacing between drillholes meeting the drilling data quality requirements must be 700 m as determined by triangulation. If any one side of the triangle is greater than 700 m, the ERCB will determine if additional drilling is required.